

A reference site for air-sea interactions monitoring in coastal domain

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Context

Most of the atmospheric/oceanic parameters are now accurately measured in situ (drifting or moored buoys, floats, VOS, profilers, coastal sites...)

Atmosphere: temperature, pressure, wind direction and speed, radiative fluxes, CO₂, N₂, rain

Ocean: SST and gradient, SSS, current, waves/swell...

In addition, existing or planned satellite products allow to integrate local measurements into a larger scale --> good geographic coverage

--> **Some parameters are not measured by satellites**

--> **Lack of coupled air-sea parameters measurements**

--> **Need for simultaneous recording of physical/chemical parameters in the surface layer**

Scientific context

Global change. Long term variations (impact on human communities)
+ intense events.

Survey/prediction of intense atmospheric phenomena

Air sea interactions need to be better represented and constrained in
the numerical models

Special focus on: (sea-air)

- SST influence on the MCS formation/cyclogenesis
- Conditions for coastal fog formation
- Heat fluxes measurements
- Mediterranean is a key area for global change monitoring, intense precipitation prediction, cyclogenesis...

Scientific context

Influence of the atmospheric conditions on the ocean surface layer

Wind stress and surface layer circulation

SST/ temp gradient and dense water formation

Western Mediterranean

 **Hymex starting 2010**

Operational needs

Previmer (Ifremer, SHOM, IRD, Region Bretagne, CG29, IUEM...)

Current, SST and SSS prediction (Mars3D)

Wave prediction (WaveWatch III and SWAN)

Primary production (ECO-Mars3D)

Forcing (wind, pressure) from met analysis/models (Arpege/Aladin)

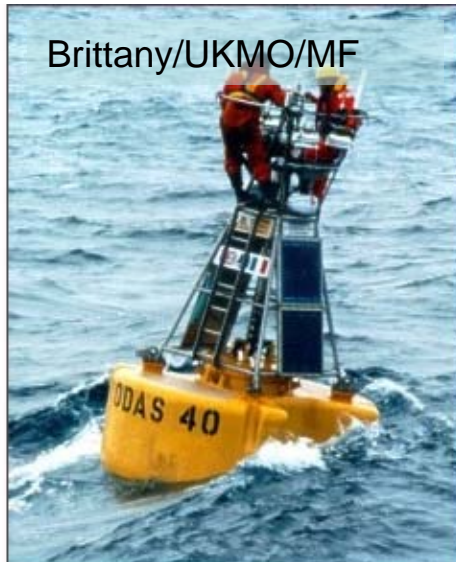
Satellite products

SST: discrepancies between moored and drifting buoys measurements

SSS: coming soon. Need for in situ validation/calibration

Radiative fluxes

Instrumentation: surface mooring



Discus from 3 to 10m.
Weight 300kg to 10T

Instrumentation: surface mooring

Existing measurements

Pressure
Air temperature
SST
Rel humidity
Wind direction and speed
Swell
Short and long wave radiation
Salinity

**Data transmission DCP Meteosat
or Argos or Iridium... or GSM**

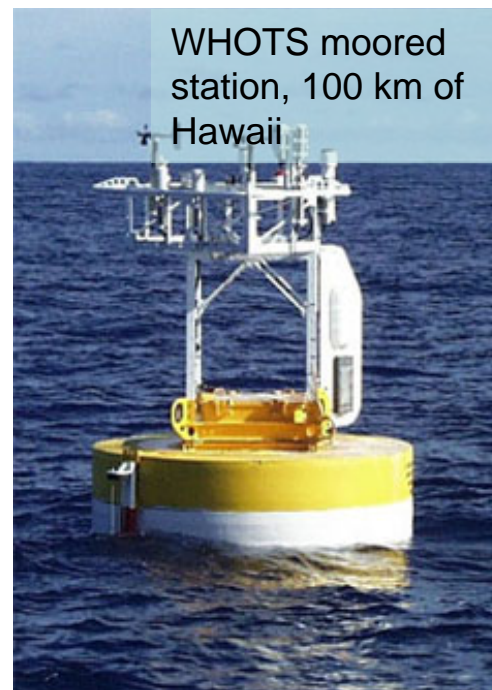
To be improved/developed

Rain
SST **
Sea temperature vertical profile
Radiation
Current and waves
Salinity vertical profile

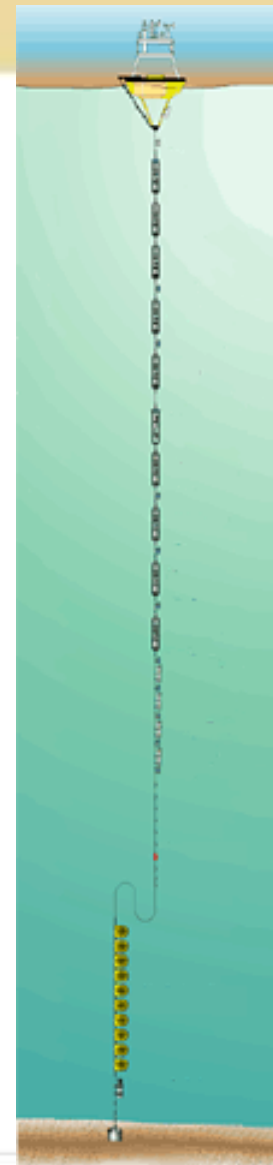


Instrumentation: surface mooring

- Atmospheric temperature
- Sea surface temperature
- Sea temperature gradient
- Wind direction and speed
- Rel humidity
- Short and long wave radiation
- Precipitation



WHOI



Instrumentation: scintillometer

Emitter



Receiver



Pictures D. Legain,
CNRM/GMEI

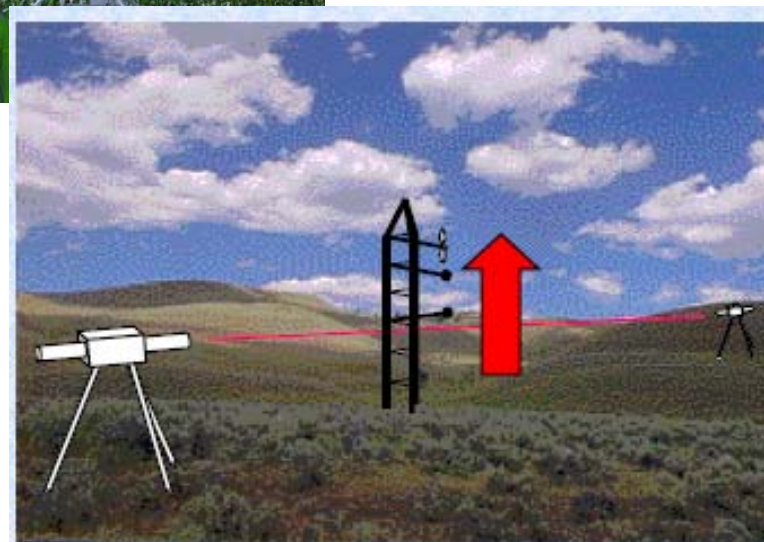


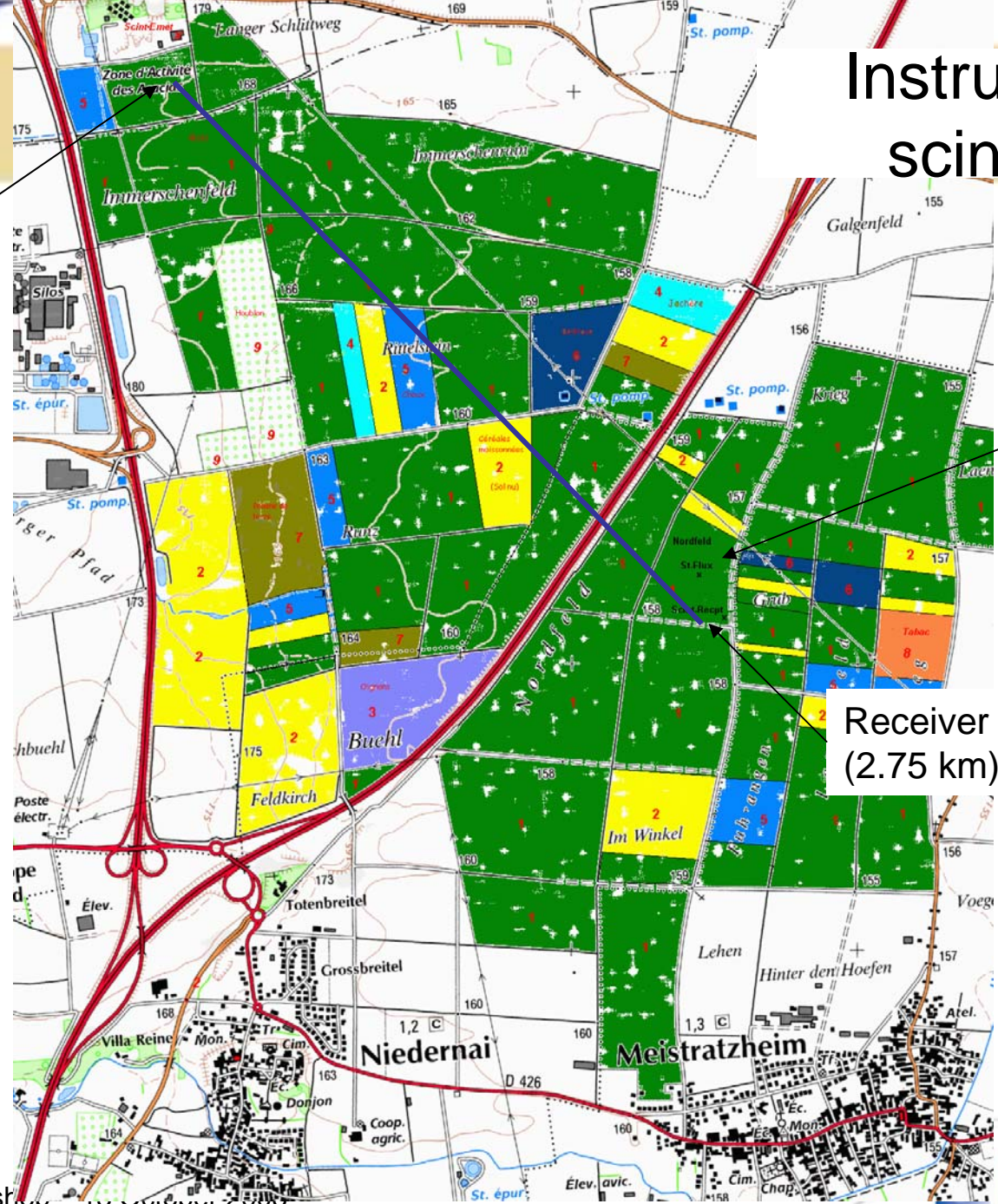
Figure J.M. Cohard, LTHE/CNRS

Instrumentation: scintillometer

Emitter

EC station

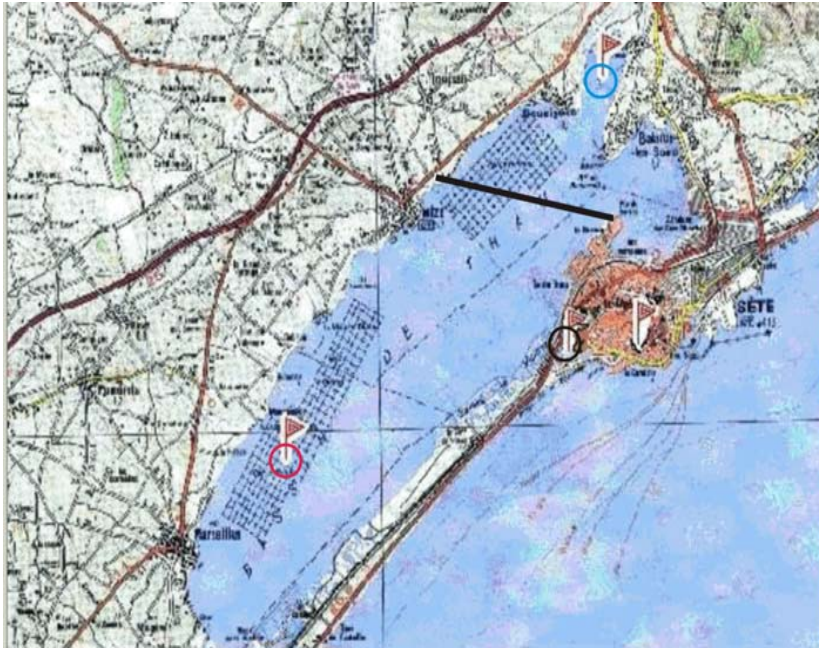
Receiver
(2.75 km)



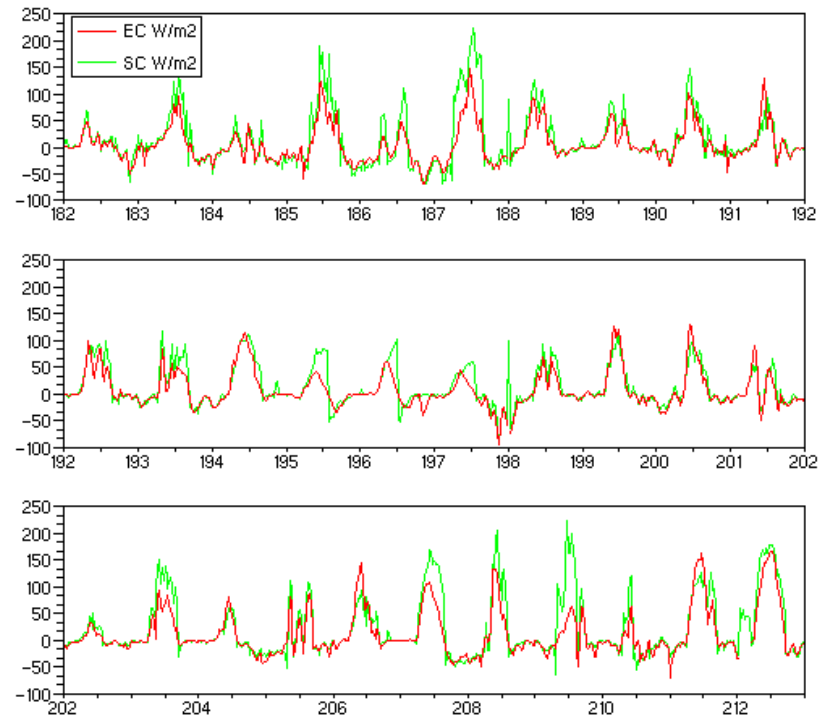
COPS 2007

Figure D. Legain,
CNRM/GMEI

Instrumentation: scintillometer



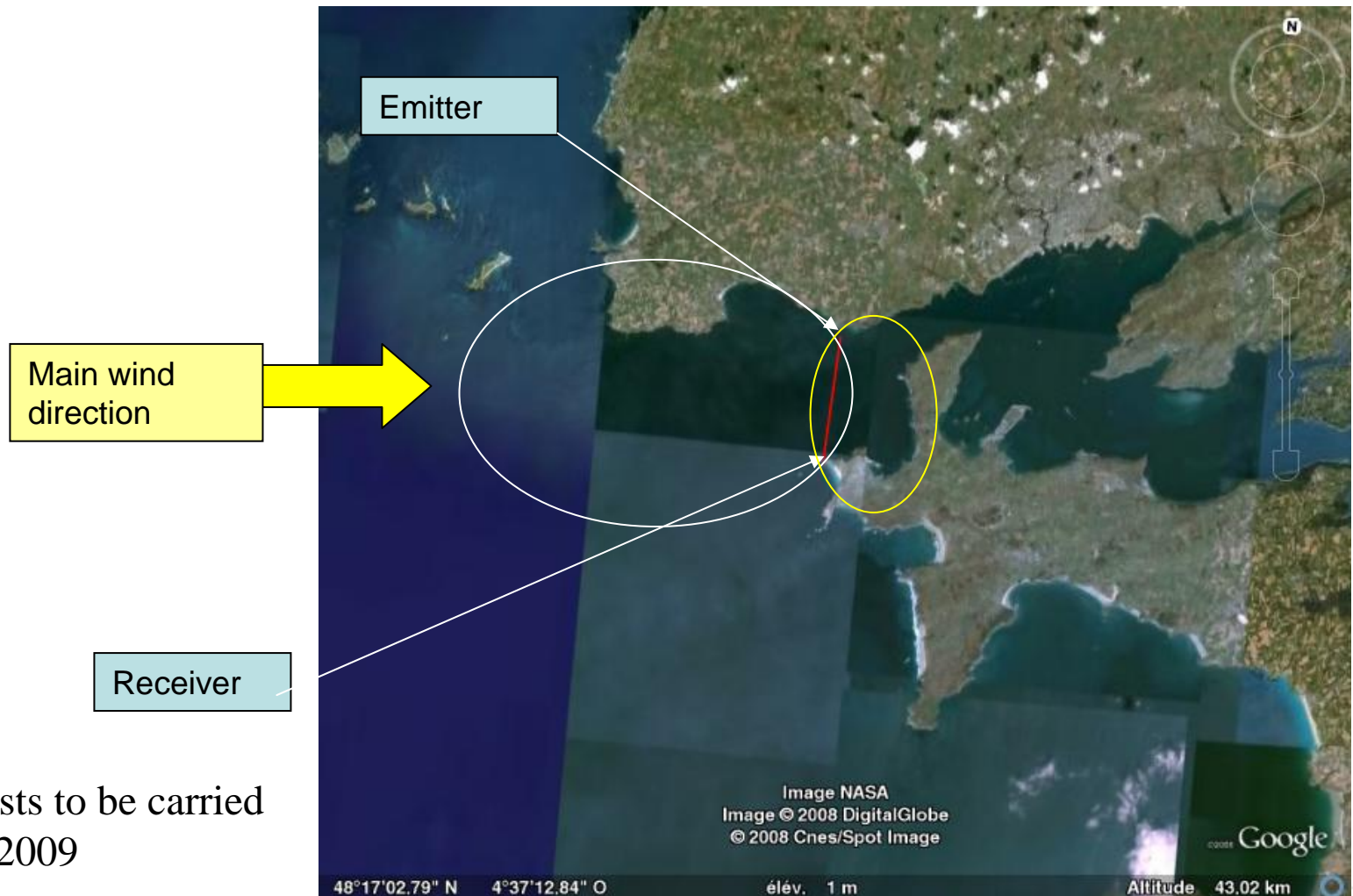
Etang de Thau, tests to be carried out in 2009



Comparison EC/scintillometry, COPS 2007

Figure D. Legain,
CNRM/GMEI

Instrumentation: scintillometer



Brest, tests to be carried out end 2009

Development

Scintillometry: first implementation in 2009 - results and validation using EC collocated measurements.

Surface mooring (Brittany) for tests / instrumentation development /

From 2011: part of Hymex experiment.

- proposal not done yet (2009)
- air sea interactions in situ monitoring and flux measurements in link with modeling/satellite products
- case studies

Two sites (Mediterranean + Brittany) or Brittany site moved to Mediterranean

Funding...

Questions

- **Where? surface mooring..**

- collocation with scintillometry
- other site in Mer d'Iroise

- **What for?**

- coupled measurements for met model constraints
- coupled/atmospheric parameters for defence applications
- currents/waves for coastal oceanography

- **How?**

- instrumentation
- floating device..
- data flow and distribution

Questions ?